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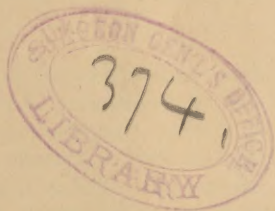
FROM THE AUTHOR.

PULSATING EMPYEMA.

REPORT OF A CASE.

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PULSATING EMPYEMA.

REPORT OF A CASE.

Read before the Philadelphia County Medical Society, May 8, 1889.

By J. C. WILSON, M.D.,

LECTURER ON PHYSICAL DIAGNOSIS AT THE JEFFERSON MEDICAL COLLEGE, ETC.

THE following case of pulsating empyema is worthy of record, not only because it illustrates a rare clinical condition, but also because it sheds light upon some points in the pathology of that condition which have been the subject of debate:

Strain in lifting; pain in left side; pleural effusion, at first serous, subsequently purulent; extensive pulsation of side; pyo-pneumothorax; paracentesis thoracis, free drainage interrupted by removal of tube; tense pneumothorax; resection of ribs; drainage.—Daniel McL., aged twenty years, unmarried, Irish, laborer in a dye-house; admitted to St. Agnes Hospital March 16, 1889. His parents are living and in good health. Three years ago the patient had an attack of chest-trouble, which continued for four weeks; since then his health has been good. He has been in this country about a year. His present illness began about six weeks prior to admission to the hospital. In lifting a large roll of cloth, he gave himself, as he says, a twist in the left side; immediately suffered severe pain, which was increased on deep breathing. There was at first no cough. After a time he began to suffer from shortness of breath and from cough unattended by expectoration, but worse at night; was able at all times to lie down in bed. The difficulty in breathing becoming urgent, his chest was tapped on three occasions during the nine days prior to his coming into the hospital, a large quantity of fluid being removed. This fluid, he says, was at the first two tapplings clear, but was on the last occasion turbid.

Upon admission, the patient presented the appearance of severe illness; tongue furred, no appetite, bowels constipated, great oppression, respiration shallow and difficult, 52 per minute; no orthopnea; face and hands slightly livid; is restless at night, sleeping very little and sweating freely; temperature 99.5° F., pulse 140, small and feeble. Urine free from albumin.

The presence of a large pleural effusion upon the left side was determined without difficulty. The respiratory movements were much restricted; the intercostal spaces obliterated; vocal fremitus feeble in the infra-clavicular region, elsewhere scarcely perceptible or absent altogether. The cardiac impulse was felt in the right side in the nipple line, and was visible in the third and fourth intercostal spaces to the right of the sternum; there were no murmurs. There was percussion dulness over the whole left chest extending to the right border of the sternum at the level of the second intercostal space. There was a distinct impulse having the cardiac rhythm over the whole of the left side anteriorly and laterally as far as the line of the posterior axillary fold. This impulse, which was very distinct upon palpation, was not visible; it was not felt posteriorly. Upon auscultation below the clavicle, feeble respiratory sounds of indeterminate quality; elsewhere absence of respiratory murmur and diminished vocal resonance.

On the 20th aspiration was performed, the needle being introduced in the eighth intercostal space slightly in advance of the line of the posterior axillary fold. About three pints of foul-smelling greenish-yellow pus were withdrawn. Patient then complaining of great pain along the spinal column on the left side, the pulse becoming small and thready, and the distress urgent, one-sixth of a grain of morphia was administered hypodermically and the aspiration discontinued.

In the original notes made at the bedside appears the following statement: "The retraction of the intercostal spaces and the extreme distress of the patient render it probable that the pus cavity is smaller than the physical signs would indicate." After this operation the patient was somewhat relieved; respiration was less labored; the temperature fell to 98° F.; but sweating at night continued, and the tongue remained dry and brown.

On the 22d it was noted that the pulsation on the left side was no longer observed to the left of the nipple line, save in a restricted area in the third intercostal space. The impulse of the heart was still felt below the right nipple, and was visible in the third and fourth intercostal spaces at the right border of the sternum. There is tenderness upon pressure over the whole of the left side of the chest.

On the 25th the signs indicated rapid reaccumulation of the fluid. The intercostal spaces were again obliterated; dyspnoea became urgent; the lividity of the face and hands, which had to some extent disappeared, returned. The patient complained of severe and continuous substernal pain. The whole antero-lateral surface of the left chest became, as before, the seat of distinct cardiac pulsation. Fever had redeveloped.

The chest-wall was perforated in the seventh intercostal space in advance of the line of the posterior axillary fold by a large trocar and canula, and after the evacuation of four pints of fetid pus, a soft rubber drainage tube was introduced, and the chest dressed antiseptically. Rapid improvement in the patient's general condition immediately followed; the temperature fell to normal; the pulse became slower and fuller; the respirations less frequent; the tongue cleaned; appetite returned; sweating at night ceased, and the patient slept fairly well. In a week he was up and about the ward. The discharge from the tube amounted to a few drachms only daily, and was no longer fetid.

On the 12th of April, the drainage tube having become clogged, was removed. The resident physician was unable to replace it.

Owing to absence from the hospital, I did not again see the patient until the 18th. I found him then very weak and feeble; skin slightly cyanotic and mottled; respiration 48; pulse 120; temperature 98° F.; no orthopnoea; appetite good; no sweating at night; the right lung resonant throughout; no râles. The impulse of the heart was felt near the right nipple, and in the third and fourth intercostal spaces, where the sounds were distinct. The left chest was distinctly flattened in its antero-posterior diameter, though the intercostal spaces were prominent, and the surface of the chest throughout tender upon pressure. There was pulsation, as before, over the antero-lateral surface of the chest, extending to the line of the posterior axillary fold. This pulsation was synchronous with the systolic impulse of the heart to the right of the sternum. It was most distinct in the second and third intercostal spaces to the left of the nipple line, but could be faintly perceived to the base of the chest. The percussion sounds were tympanitic anteriorly above the level of the fourth rib, and flat below. Posteriorly percussion resonance was flat, except at the extreme apex.

Upon auscultation the heart sounds were faintly heard all over the left chest, anteriorly and laterally; posteriorly they were inaudible. Above the fourth rib anteriorly, in the region yielding tympanitic percussion resonance, the respiration and voice signs had an obscure amphoric quality, and the coin test yielded the bell sound. There was no metallic tinkling upon coughing, nor was there succussion. There was no change in the relative distribution of tympany and dulness upon change of posture.

The dyspnoea increasing and the substernal pains being more pronounced, it was decided to open the pleura freely. This was done April 27th, by Dr. Mears, after the resection of an inch each of the sixth, seventh, and eighth ribs in the axillary line. Upon puncture of the pleura, there was an escape of air, and the wound being enlarged to permit of an examination of the cavity, it was found free from pus. The finger perceived the compressed lung, which transmitted the cardiac impulse; and a large probe being carried into the wound and gently brought in contact with the lung, was perceived to move synchronously with the cardiac systole. After the operation, the heart did not return to its normal position, but continued to beat to the right of the sternum. A large drainage tube was introduced.

The medicinal treatment consisted from the beginning in quinine and Basham's mixture. Whiskey, in the form of milk-punch, was administered in moderate amounts.

May 7. Active fever followed the operation. On the third day there was a purulent discharge, which continues until the present time, amounting to two or three ounces in the course of twenty-four hours. The chest is markedly flattened, as well in the infra-clavicular region as at the level of the resected ribs. The respirations have ranged between 30 and 40; the pulse between 98 and 140; the temperature, which reached 103° F. upon the fourth day after the operation, is this morning normal; the appetite is fair; the bowels are regularly moved; slight sweating at night. The pleural cavity is washed out twice daily with a solution of salicylate acid and borax. The case has been transferred to the surgical wards.

In the left infra-clavicular region there is vesiculo-tympanitic resonance with a feeble inspiratory murmur. There is here also distinct vocal resonance and vocal fremitus. Below the level of the third rib there are characteristic amphoric signs. In the second intercostal space, to the left of the nipple line, there may be still perceived, upon careful palpation, a faintly transmitted cardiac impulse.

The sequence of events in the foregoing case appears to have been the following: Strain in lifting causing laceration of the pulmonary pleura (whether pleural adhesions, set up during the sickness three years ago, had any part in determining such a lesion or not cannot be decided); pneumothorax followed by serous effusion; aspiration in the fourth week, twice repeated at short intervals; pyo-pneumothorax with firm compression of lung, the lower lobe of which is completely airless, and probably adherent to the pericardium; slight expansion of upper lobe after aspiration; heart dislocated and retained in its new position by inflammatory adhesions; transmission of impulse from displaced heart through contracted left lung, at first to fluid contents, later to tensely confined air in the pleural cavity, with pulsation of the chest-wall; this pulsation more distinct and persistent opposite the second and third intercostal spaces, probably there transmitted through the compressed lower portion of the upper lobe, which has contracted adhesions at that point.

The tension of the pleural cavity, which, shortly after the removal of the first drainage tube, produced flatness on percussion below the area of the adherent lung, is only explicable upon the hypothesis of a persistent rent in the pulmonary pleura.

Pulsating pleural effusion appears to be an extremely rare condition. Comby¹ collected twenty-seven cases; Kepler² added to the list eleven cases, only two of which were reported by the American authors, making the number thirty-eight. Comby,³ in a recent review of the subject, gives references to seven more cases, bringing the number up to forty-five. Osler⁴ adds to this list a very carefully reported case of his own, and brief notes of three other cases from American sources. These, with my case, make a total of fifty thus far reported.

The condition is almost invariably encountered in left-sided effusions; in three instances, however, was the empyema on the right side.⁵ The effusion has in every instance, save one reported by Kepler, been purulent. For this reason, Comby suggests that the

¹ Archives Générales, Nov. and Dec. 1883.

² Deutsches Archiv für klin. Medicin, pp. 220-240, 1887.

³ Archives Générales, April, 1889

⁴ American Journal of the Medical Sciences, January, 1889

Vide Osler's paper.

term *pulsating empyema* should be employed, instead of *pulsating pleurisy*.

The cases may be referred to two general groups :

1. Intra-pleural pulsating effusions.
2. Pulsating empyemata necessitatis.

The latter is the more common. The external tumor is usually single, but in several instances there have been two or more tumors present. The pulsating tumor may often show itself at some distance from the thorax. Thus, it has been on two occasions observed in the lumbar region.¹ In a small proportion of the cases the pulsation has been observed in recent effusions; as a rule, however, it does not appear until the fluid has been present for some time.

The diagnosis is unattended by difficulty. It is true that the site of the pulsation and its cardiac rhythm suggest aneurism of the thoracic aorta, especially when the pulsations are sufficiently strong to move the hand visibly in palpation or the head in auscultation. Here, however, we must note the absence of aneurismal pulsatile expansion, of murmur, and of thrill. Osler proposes, in cases of doubt, exploratory puncture with a very fine hypodermic needle.

Among the theories that have been advanced to account for this condition, that of Comby, which rests upon three post-mortem examinations, has much in its favor, though it cannot be invoked to explain all the cases. Having found the left lung firmly flattened and adherent to the pericardium, Comby thinks that this anatomical disposition plays an important part in the transmission and amplification of the movements of the heart. It is true that this theory is open to serious objections, especially since the lung has not been found in all cases in a condition of atelectasis. Comby declares himself, therefore, ready to accept some less questionable pathogenic theory.

The theory of Féréol² is a modification of that of Comby. He holds that the presence of pneumothorax in connection with a large pleural effusion is the condition *sine quâ non* of pulsating empyema, and he supposes that this pneumothorax is closed, and that it forms an elastic cushion between the heart and the wall of the chest, to which the pulsations are communicated after the manner of the rubber air-cushions of Marey's cardiograph.

In the case that I have reported, the condition fully responded to the requirements of Comby's theory, the lung being, in part,

¹ Vide Comby, *Revue Critique*, Archives Générales, April, 1889.

² Contribution à l'Etude des Pleurésies pulsatiles (Académie de Médecine, 5 février, 1884; et Société Médicale des Hôpitaux de Paris, 14 mars, 1884).

fully compressed and adherent to the pericardium and communicating the cardiac pulsations with distinctness and some degree of force to the finger introduced into the pleural cavity, and to a probe brought in contact with it through the pleural wound. The wide extent of the perceptible pulsations during the period immediately preceding the last operation at a time when the pleural cavity was tensely distended with air, but containing no fluid, demonstrates the fact that, under certain conditions, the cardiac pulsations are capable of being transmitted through a tense pneumothorax to the surface of the chest. And the persistence of distinct pulsation in the second intercostal space, to the left of the nipple line, at the present time, after the pleura has been freely opened, justifies the conclusion that pulsation may, under certain conditions, be transmitted through a considerable extent of compressed and airless lung. What these conditions may be must be determined by further investigations.

It may be affirmed, in conclusion, that no one of the theories hitherto advanced is adequate to account for all the cases, but that there are several distinct conditions which favor the development of pulsations in pleural effusions. The difficulty in formulating any comprehensive theory arises from the fact that every condition hitherto invoked to explain this curious phenomenon is frequently present in left-sided pleural effusions that show no pulsation whatever.